

ANUSHA J. PAI ASNODKAR

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RESEARCH INTERESTS

Spectroscopic characterization of giant exoplanets to observationally constrain atmospheric circulation, atmospheric escape, thermal structures, and formation theories.

EDUCATION

The Ohio State University

08/19 — Present

Ph.D, Astronomy, Department of Astronomy. Expected graduation in 2025.

California Institute of Technology

09/15 — 06/19

B.S., Physics, Division of Physics, Math, and Astronomy.

RESEARCH

Optical testbed for a dual-aperture fiber nuller

08/21 — Present

The Ohio State University, Department of Astronomy

Prof. Ji Wang

Developing an optical test bench of a dual-aperture fiber nuller design concept for applications in spectroscopy of directly imaged exoplanet systems.

Skills/Software: Optics, Python

Atmospheric characterization of ultra-hot Jupiters

08/19 — Present

The Ohio State University, Department of Astronomy

Prof. Ji Wang

Applying high-resolution transmission spectroscopy of ultra-hot Jupiters to detect atomic/ionized species as tracers of planetary and atmospheric dynamical properties. Publications in preparation.

Skills/Software: Python, MCMC, Gaussian Processes

Detector calibration and numerical modeling of critical phenomena

06/18—06/19

Jet Propulsion Laboratory, Division 382J

Dr. Inseob Hahn

Combined skills in optics and programming to extract CMOS image sensor pixel response functions and corrections to detector distortions by laser interferometry. Participated in secondary project implementing crossover parametric model of critical phenomena.

Skills/Software: Optics, electronics, Python, MATLAB, Mathematica, numerical methods

Design and construction of an extended cavity diode laser for spin initialization in rare-earth quantum memories

06/17—08/17

California Institute of Technology, APhMS Department

Prof. Andrei Faraon

Constructed and characterized a tunable extended cavity diode laser customized to applications in quantum memories based on Ytterbium-doped crystals. Tested for thermal, structural, and spectral robustness. Assembled circuitry for precise optical pumping and ensemble preparation.

Skills/Software: Optics, electronics, MATLAB, Mathematica

Characterizing the oblateness of the Milky Way's Outer Halo

06/16—08/16

California Institute of Technology, PMA Department

Prof. Judy Cohen

Synthesized population models of the Milky Way's Outer Halo to quantify its oblateness. Implemented routine for constructing ML-based Lomb-Scargle periodograms of RR Lyrae light curves.

Skills/Software: Python, time-series analysis

Complex networks and NoCs intern at teuscher.:Lab

06/13—06/15

Portland State University, ECE Department

Prof. Christof Teuscher

Developed an iterative model for developing networks-on-chip (NoCs) incorporating traffic throughput as a metric in the design process.

Skills/Software: MATLAB

Applied neural network analysis techniques (community and motif detection) to correlate structural aspects of complex NoCs with cost-efficiency. Refer to co-authored publication.

Skills/Software: MATLAB

PUBLICATIONS

[Accepted] **KELT-9 as an eclipsing double-lined spectroscopic binary: a unique and self-consistent solution to the system**

Pai Asnodkar, A., Wang, J., Gaudi, B. S., Cauley, P. W., Eastman, J., Ilyin, I., Strassmeier, K., Beatty, T. (2021). Accepted to The Astronomical Journal, arXiv:2110.15275.

[Submitted] **Variable and super-sonic winds in the atmosphere of an ultra-hot giant planet**

Pai Asnodkar, A., Wang, J., Eastman, J., Cauley, P. W., Gaudi, B. S., Ilyin, I., Strassmeier, K. (2021). Submitted to AAS Journals.

A Structural Analysis of Evolved Complex Networks-on-Chip

Haera Chung, Anusha Pai Asnodkar, and Christof Teuscher. 2012. A structural analysis of evolved complex networks-on-chip. In Proceedings of the Fifth International Workshop on Network on Chip Architectures (NoCArc '12). ACM, New York, NY, USA, 17-22. <http://doi.acm.org/10.1145/2401716.2401721>

RESEARCH PRESENTATIONS

Measuring Rapid Global-scale Winds on KELT-9 b

Emerging Researchers in Exoplanet Science (ERES) Conference, May 2021

Global-scale Winds and Dynamical Mass of the Ultra-hot Jupiter KELT-9 b

Invited, NASA Jet Propulsion Laboratory Exoplanet Journal Club, May 2021

Caltech SFP SURF Seminar Day (2016, 2017, 2018)

Presented on research conducted during the summer of each respective year.

Intel International Science and Engineering Fair (05/14)

Presented NoC research at 2014 Intel ISEF in Los Angeles in the category of Computer Science.

WORKSHOPS AND SUMMER SCHOOLS

AstroTech Summer School

University of California, Berkeley, July 2021

Erdős Institute Data Science Boot Camp

Virtual, May 2020

Final group project selected within top 5.

High-Resolution Infrared Spectroscopy for Exoplanet Characterization Hackathon

Caltech, February 2020

2018 Southern California Conference for Undergraduate Women in Physics (CUWiP)

AWARDS AND HONORS

2021 Edward F. Hayes Research Forum, The Ohio State University

Selected to present an oral presentation and awarded honorable mention in the category of Mathematical and Physical Sciences.

The David G. Price Fund-Research Associateship in Astronomical Instrumentation

Received fellowship twice from 2020-2022.

MENTORSHIP

- The Ohio State University Polaris Program** **08/20 —Present**
Providing academic counseling and semester-long research project mentorship for undergraduates.
- SciAccess Zenith Mentorship Program** **09/20 —12/20**
Provided college guidance and citizen science project mentorship for blind and visually-impaired high school students interested in space sciences.

OUTREACH

- OSU Undergraduate Research Summer Access (URSA) Program** **08/21**
Organized program logistics and led cohort-building activities for a 2-week long early arrival program aimed at incoming OSU freshman in physics and astronomy.
- The Ohio State University Astronomical Society** **11/20**
Presented in-prep. work on atmospheric dynamics of KELT-9 b.
- Columbus Astronomical Society** **04/20**
Co-presented a historical overview of women in astronomy with cohort.

TECHNICAL STRENGTHS

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| Operating systems | Linux/Unix, Windows |
| Languages | Python, MATLAB, Mathematica, R, HTML, CSS |
| Astronomy Software | numpy/scipy/astropy, emcee, george, Spectroscopy Made Easy (SME), petitRADTRANS |
| Miscellaneous | Optics, LaTeX, GitHub |